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Deposited in DRO:

02 December 2019

Version of attached file:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Zhang, J. and Beckmann, N. and Beckmann, J.F. (2022) 'One situation doesn't fit all: variability and stability of state willingness to communicate in a Chinese College English classroom.', *Language teaching research.*, 26 (3). pp. 504-529.

Further information on publisher's website:

<https://doi.org/10.1177/1362168819891330>

Publisher's copyright statement:

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One situation doesn't fit all: Variability and stability of state willingness to communicate in a
Chinese College English classroom

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This manuscript has been accepted for publication in *Language Teaching Research* (Nov 2019).

Citation: Zhang, J., Beckmann, N., & Beckmann, J.F. (in press). One situation doesn't fit all: Variability and stability of state willingness to communicate in a Chinese College English classroom. *Language Teaching Research*.

One situation doesn't fit all: Variability and stability of state willingness to communicate in a Chinese College English classroom

Abstract

Willingness to communicate (WTC) used to be studied as a relatively stable, trait-like predisposition; however, recently attention has shifted to the more dynamic, state-like components of WTC. This research investigates variability and stability in *state* WTC, particularly focusing on within-person variability, which may lead to stable between-person differences, and situational antecedents that can either promote or hinder state WTC in L2 classrooms. To investigate whether, how and why state WTC varies over time, this study used a high-density repeated measurement design and a group of Chinese university students to describe fluctuations in state WTC in English classrooms over one semester. Data related to state WTC and selected situational antecedents were collected through a self-report questionnaire and statistically analysed. It was found that state WTC varied systematically within the person across the semester, and this variability was systematically related to changes in the psychological properties of the learning situations (e.g. teacher and peer support, task-interest, and task-importance). It was also found that within-person variability in state WTC predicted language learning performance, e.g. students whose state WTC increased as a function of perceived task interest tended to achieve higher grades at the end of the semester. This study calls for more attention to be directed at within-person variability in state WTC, and provides novel insights into how relationships between state WTC and its situational antecedents may be investigated within individuals. This work is of interest to researchers and practitioners who aim to enhance L2 learners' state WTC and language learning performance by systematically shaping their situated learning experience.

Keywords

second language acquisition, state willingness to communicate, within-person variability, situation contingencies, language learning performance

I Introduction

In the field of second language acquisition (SLA), the competency to actively communicate has received much attention. In this study we aim to extend the notion of willingness to communicate (WTC) being trait-like stable by exploring the extent to which WTC in individual learners varies systematically and meaningfully across different learning situations. By quantifying the amount of observable within-person variability in WTC, and calculating its relationships with selected situational antecedents and language learning performance as an outcome, this study makes three main contributions. Firstly, it raises awareness of the considerable amount of observed within-person variability in WTC, which is comparable to the amount of between-person variability (i.e. individual differences) in WTC documented in the research literature. Few studies have tracked within-person fluctuations in WTC over time (e.g. Cao, 2013; Pawlak, Mystkowska-Wiertelak & Bielak, 2016); however, these studies did not document quantifications of the extent to which WTC varies within individuals.

Secondly, this study is one of the first few attempts that empirically analyse the within-person relationships between WTC and its situational antecedents (e.g. students become more willing to communicate as they receive more support). Such within-person relationships indicate that within-person variability in WTC is systematic and thus calls for further investigation. Previous studies (e.g. Eddy-U, 2015; Khajavy, Ghonsooly, Fatemi & Choi, 2016; Peng & Woodrow, 2010; Riasati, 2012) have predominantly focused on between-person relationships (e.g. students who receive more support than others tend to be more willing to communicate than those who do not receive such support), without considering fluctuations in WTC over time, and the co-variations between WTC and its situational antecedents within individuals.

Thirdly, this study shows that systematic within-person variability in state WTC contributes to the prediction of language learning performance, i.e. students who are more willing to communicate when perceiving communication tasks as more interesting tend to perform better. A small number of studies have found substantial associations between WTC and language learning performance (e.g. Oz, 2014; Piechurska-Kuciel, 2018); however, these studies were merely at the trait level (i.e. students who are generally more willing to communicate than others tend to also perform better than others) without taking systematic within-person variability in WTC into consideration. To our knowledge, this is the first study to test the relationship between situation-contingent WTC and language learning performance. We therefore believe that it has the potential to provide useful information for researchers and

practitioners who would like to enhance student state WTC and language learning by systematically managing classroom situations.

As English is seen as not just a language for interpersonal interaction, but also a way of keeping in touch with the rest of the world, Chinese universities require all non-English major undergraduates to take College English courses. According to the Ministry of Education of the People's Republic of China (MOE), a major goal of College English courses is to develop comprehension competence, particularly communicative competence in terms of listening and speaking (MOE, 2007). To achieve this goal, communicative language teaching (CLT) has been approved as the principal approach for teaching English in China (Yu, 2001). As a result, active participation in communication tasks is always expected and encouraged in Chinese College English classrooms. Compared to students who eagerly communicate in class, those who seem to be less willing to communicate are often seen as passive learners who are less likely to acquire high levels of English proficiency (MacKinnon & Manathunga, 2003). According to the Council of Europe, the aim of language learning is to overcome barriers to communication among people of different languages and cultural backgrounds, to enable them to better understand and closely co-operate with each other (Council of Europe, 2001, 2018). Similarly, the Japanese Ministry of Education, Culture, Sports, Science, and Technology (MEXT) defines foreign language proficiency as the capability of using a foreign language to communicate effectively with people from different countries and cultures (MEXT, 2011). Hence, modern language pedagogy emphasises communicative competence and spends much time on communication tasks (MacIntyre, Baker, Clément & Donovan, 2003).

II The dynamic nature of WTC

WTC was originally introduced into L1 literature as a stable predisposition to explain observed differences between Language learners' communication behaviour (McCroskey & Richmond, 1990). Although McCroskey and Richmond (1990) noticed possible *within-person* variability in WTC across different contexts (e.g. in public, meetings, groups, and dyads), they primarily focussed on *between-person* variability and proposed that WTC is largely rooted in personality. When introducing the concept to Second Language Acquisition (SLA), MacIntyre, Dörnyei, Clément, and Noels (1998) defined WTC as "readiness to enter into discourse at a particular time with a specific person or persons, using a L2" (p. 547). This definition alludes to the

dynamic nature of L2 WTC, compared to the original trait-like L1 concept of WTC. MacIntyre et al. (1998) situated WTC in specific contexts, suggesting that situation variables play more direct and decisive roles than fixed person variables (e.g. personality) in influencing L2 WTC.

Although the dynamic perspective is relatively new to SLA, it has received growing attention. In support of MacIntyre et al. (1998), Peng and Woodrow (2010) suggested to conceptualise L2 WTC at both trait and state levels. Similarly, Mystkowska-Wiertelak and Pawlak (2017) suggested to integrate a macro- and micro-perspective to arrive at a more comprehensive conceptualization of L2 WTC. The macro-perspective focuses on linear relationships between *trait WTC* and other relevant dispositions, while the micro-perspective is more context sensitive, exploring *state WTC* in specific situations and its fluctuations over time. Most previous studies on WTC adopted a macro-perspective, focusing on the trait level; however, the dynamic nature of WTC cannot be studied without adopting a micro-perspective (Mystkowska-Wiertelak & Pawlak, 2017). Therefore, research on L2 WTC is expected to benefit from adopting a dynamic or micro-perspective by taking the state characteristics of WTC, e.g. fluctuations of state WTC over time and across situations, into consideration.

III Situational antecedents of state WTC

Numerous studies have investigated the relationships between WTC and related situational variables (e.g. Eddy-U, 2015; Khajavy et al., 2016; Khajavy, MacIntyre & Barabadi, 2017; Peng, 2019; Peng & Woodrow, 2010; Riasati, 2012); however, this has been done with a trait perspective. WTC and other study variables were measured only once, which makes it impossible to identify fluctuations and co-variations over time. For example, using a sample of 2,058 non-English major undergraduates from 14 universities in China, Peng (2019) found that classroom environment was the strongest predictor of WTC ($r = .41$). A small group of recent studies (e.g. Cao, 2011, 2013, 2014; Kang, 2005; Peng, 2012; Peng, Zhang & Chen, 2017; de Saint Léger & Storch, 2009; Zhong, 2013) have investigated WTC at the state level, and have identified various situational antecedents that may affect state WTC over time.

When studying potential effects of situational antecedents of state WTC, Kang (2005) differentiated psychological antecedents from physical situational variables. After observing and interviewing four Korean students at a North American university over eight weeks, Kang

(2005) concluded that state WTC may be directly affected by three psychological antecedents (i.e. security, excitement, and responsibility) that are perceived based on physical situational variables related to the topic, interlocutors, and conversational context. In line with Kang (2005), Zhang, Beckmann and Beckmann (2018) suggested to clearly differentiate between *situation cues* (i.e. physical or objective features of situations) and *situation characteristics* (i.e. psychological or subjective perceptions of situations, see Rauthmann et al. 2014). By reviewing published research on trait and state WTC, Zhang et al. (2018) categorised frequently reported situational antecedents of state WTC into three interlinked layers: situation cues (e.g. the task, teacher and classmates), situation characteristics (e.g. support, cooperation, and objectives), and major underpinning psychological dimensions of situation characteristics (e.g. duty, positivity, and negativity), and suggested to focus more strongly on situation characteristics as they are more direct antecedents of state WTC but so far have received less attention in the research literature compared to situation cues.

One important situational characteristic related to state WTC is *support*, be it from a teacher or from peers. After interviewing four Chinese university students six times over one and a half semesters, Peng (2012) suggested that *teacher support* and immediacy behaviours seemed to facilitate state WTC in L2 classrooms. Using a similar methodology, Cao (2011, 2013, 2014) found that, other than teacher support, *peer support* (i.e. classmates or group members who are talkative and cooperative) could also bring about higher state WTC.

Another frequently reported situational characteristic affecting state WTC is *task-usefulness*, which is also labelled as *task-effectiveness*. By studying five Chinese students in New Zealand for eighteen weeks using interviews, observations, and learning logs, Zhong (2013) found that state WTC in L2 classrooms was affected by perceived task-effectiveness, particularly during group or pair communication activities. Participants in Peng's (2012) longitudinal study also reported that they preferred to participate in useful and meaningful communication tasks that could contribute to language learning.

Task-interest is another situational characteristic repeatedly looked at in previous studies on state WTC. For example, participants in Cao's (2013, 2014) studies indicated that they were more willing to communicate when they were interested in a topic or task and had ideas to share. Kang (2005) reported that students tend to feel excited talking about topics they are interested in and familiar with, and thus display higher levels of state WTC.

State WTC also seems to be influenced by *task-difficulty*. Using a longitudinal study with 32 advanced learners of French in an Australian university, de Saint Léger and Storch (2009) found that difficult tasks could trigger anxiety, which seemed to reduce state WTC. Similarly, Kang (2005) suggested that after experiencing difficulties or problems, students may feel discouraged and thus become less willing to communicate. However, Eddy-U (2015) pointed out that extremely simple tasks could also be demotivating. Hence, Eddy-U (2015) believed that tasks at appropriate levels of difficulty, i.e. neither too difficult nor too easy, are most likely to promote state WTC.

However, except for de Saint Léger and Storch (2009) who used a comparably larger sample ($N = 32$), all of the above-mentioned longitudinal studies on state WTC were very small-scale studies (i.e. less than twelve participants). They tended to rely on qualitative data collected through interviews, learning journals, and classroom observations. Among these studies, only Cao (2013) attempted to track state WTC trajectories over time and provide statistical evidence for within-person variations in state WTC. However, Cao (2013) only had six measurement occasions over a five-month period obtained from only six participants, which might be a reason for not being able to have identified any discernible patterns of state WTC fluctuation over time. Hence, larger-scale studies using more frequent measurements are needed to further explore within-person variability in state WTC and its relationships with different situational antecedents.

IV High-density repeated measurement approach

The high-density repeated measurement approach is a relatively novel method to investigate within-person variability in state WTC. This approach employs repeated measurements of the same participants across different learning situations to capture fluctuations in their thoughts, feelings, and behaviours in relation to the challenge of learning a L2 (Zhang et al., 2018). Five recent studies (MacIntyre & Legatto, 2011; Mystkowska-Wiertelak, 2016; Mystkowska-Wiertelak & Pawlak, 2014; Pawlak & Mystkowska-Wiertelak, 2015; Pawlak et al., 2016) have used the high-density repeated measurement approach to investigate within-person variability in state WTC on a moment-to-moment basis. They repeatedly measured a group of participants' state WTC as well as other related variables over a very short period of time (e.g. more than ten times during a learning task or a lesson). Two of these studies (Mystkowska-Wiertelak &

Pawlak, 2014; Pawlak et al., 2016) used relatively large samples. For example, Pawlak et al. (2016) asked four groups of Polish undergraduates ($N = 60$) to report state WTC every five minutes, when they received a computer-generated signal, over a 60-minute period during a lesson. By focussing on a group of twelve participants, Pawlak and colleagues found variability in state WTC both within the group and within the individual members over time. Mystkowska-Wiertelak (2016) took this a step further, looking at more long-term variability in state WTC (i.e. over one semester). A group of 12 students' state WTC was measured every 5 minutes in a lesson for seven lessons during a semester to explore possible variability in state WTC both within each lesson and across different lessons. Interestingly, Mystkowska-Wiertelak (2016) only found within-person variability in state WTC within specific lessons and activities, but not across different lessons during the semester. These studies are informative for future research on the dynamic nature of WTC, as they provide first evidence that state WTC varies within-person, even over very short periods of time, and offer novel and interesting insights into how within-person variability of state WTC may be studied.

V State WTC and language learning performance

It is widely believed that language learning gradually occurs during the process of interacting with others in communication tasks (Kang, 2005). However, only a few recent studies (e.g. Mahmoodi & Moazam, 2014; Oz, 2014; Piechurska-Kuciel, 2018) have reported significant correlations between WTC and language learning performance ($r = .31$, $N = 44$; $r = .27$, $N = 168$; $r = .24$, $N = 534$), and most of them focused exclusively on trait WTC. To our knowledge, only Zhang, Beckmann and Beckmann (submitted) have tested the relationship between state WTC and language learning performance, and reported a unique contribution of WTC (both trait and mean state WTC) to the prediction of language learning performance ($r = .49$, $r = .31$) in a group of 70 first-year non-English major undergraduates. The contribution of systematic within-person variability in state WTC for predicting language learning performance deserves further investigation.

The current study focused on variability, particularly within-person variability, in state WTC, quantifying and comparing the extent of between- and within-person variability, and identifying situational antecedents that contribute to such variability. This study also explored whether systematic within-person variability in state WTC contributes to the prediction of

language learning performance. The main questions addressed in this study are:

1. Variability: How variable is state WTC in L2 classrooms when assessed over one semester?
2. Systematicity: How is between- and within-person variability in state WTC related to situation characteristics in L2 classrooms?
3. Predictability: Is systematic variability in state WTC predictive of L2 learning performance?

VI Method

Focusing on within-person variability in state WTC across different learning situations, this study employed a high-density repeated measurement approach. Participants were asked to rate their state WTC as well as related situation perceptions in 13 lessons over a four-month semester on a self-report questionnaire. To indicate language learning performance, participants also reported their end-of-term English scores.

1 Context and participants

Two classes of first-year science (i.e. non-English major) undergraduate students from a major university in Beijing ($N = 103$; 85 males, one participant did not report his or her gender) were recruited.¹ Participants' age ranged from 17 to 21 (mean = 19; $SD = 0.85$). All participants were Chinese who spoke Mandarin as their L1 and English as a L2, and none of them had learned other languages. All participants were required to take a College English course taught by the same teacher. Data reported by one participant were excluded from analysis, due to a response pattern across all measurement occasions that suggested a lack of engagement with the instructed task.²

2 Materials

The questionnaire that participants responded to throughout the semester elicited situation cues and characteristics, including relevant major situation dimensions, and state WTC in respective lessons or activities. The questionnaire directed participants to reflect on experiences during the communication activity they had just completed and to report their thoughts, feelings, and behaviours at that particular moment. All items were on a 7-point Likert-type scale, with

response options ranging from “not at all” to “extremely”.

Situation cues and characteristics. Ten items were relevant to features of learning situations in an English classroom, such as the task, teacher, and peers. The emphasis was mainly on students’ subjective perceptions (i.e. situation characteristics) in terms of task-usefulness (‘The activity was important.’), task-interest (‘The activity was interesting.’), task-difficulty (‘The activity was difficult.’), as well as teacher (‘The teacher was supportive.’), classmate (‘The class was active.’ and ‘My classmates were supportive.’), and partner support (‘I was familiar with the people I interacted with.’, ‘The English proficiency of the people I interacted with was higher than mine.’ and ‘The people I interacted with were cooperative.’).

Major situation dimensions. The classroom situation was also assessed on a more generic level than situation cues and characteristics which related to a specific communication activity. Rauthmann and Sherman’s (2016) ultra-brief 8-item assessment of situation characteristics was used to measure eight major situation dimensions that might also be relevant to the current learning situation. One item (‘Somebody is being deceived.’) was excluded from the questionnaire, as deception seemed unlikely to occur in L2 learning classrooms. The remaining seven dimensions were all measured (see Appendix A). The focus was on duty (‘Work had to be done.’), positivity (‘The situation was pleasant.’), and negativity (‘The situation contained negative feelings, e.g. stress, anxiety, shame.’) as summarised by Zhang et al. (2018).

State WTC. One item was included to measure intention to communicate in English during a specific activity in the classroom (‘I was willing to communicate in English during the activity.’), i.e. state WTC.

3 Procedure

During the semester under study, participants attended College English lessons as usual. During a break in the middle of each lesson or at its end a short questionnaire (see appendix A) was distributed eliciting students’ reflections on the communication activity they had just completed as well as their momentary thoughts and feelings experienced during the communicative activity.

The questionnaire was administered 13 times during the four-month semester. However, mainly due to class attendance, only about 45% of participants completed the questionnaire on all 13 measurement occasions. Altogether, 1118 responses were received (i.e. an average of 11

responses per participant; $SD = 3.09$; response rate = 84%).

At the end of the semester, each participant was asked to report their end-of-term English score on a hundred-point scale: a score below 60 indicated a fail, between 60 and 80 a pass, and above 80 a distinction. This score was a weighted mean of a student's results in the final exam and their teacher's judgement. The final exam, which accounted for 70%, was a paper-based exam emphasising grammar and vocabulary; whilst the teacher judgement, which accounted for 30%, was the course teacher's subjective evaluation of each student's class participation and performance during the semester.

4 Data analysis

Two approaches were used for analysing the data, a more conventional one focussing on SD s and correlations, and a more sophisticated hierarchical linear modelling (HLM) approach. The latter allows for a systematic analysis of the data at both between- and within-person levels. In technical terms, data reflecting multiple measurements of the same group of participants over time are hierarchically structured as different occasions are nested within individuals, i.e. the states observed over time at Level 1 are nested within individuals at Level 2 (Raudenbush & Bryk, 2002). Failing to reflect the hierarchical structure of the data in the analysis is problematic as it promotes an aggregation bias (see Schmitz, 2006 for details). For example, changes in some individuals can be cancelled out by changes in others. That is, a low level of aggregate, group-level change cannot be interpreted as stability at the level of the individual. Hence, when studying within-person fluctuations using a high-density repeated measurement design, the aggregated and individual levels should be clearly distinguished, and data at different levels should be analysed separately (de Vaus, 2001).

Using an HLM approach, the relationships between dependent and independent variables, and the variation occurring at each level can be formally represented by equations in a sub-model, and the relations between different levels within the model can be specified (Raudenbush & Bryk, 2002). This approach has been widely applied to study the effect of situational antecedents on trait-relevant personality states such as conscientiousness and neuroticism (e.g. Beckmann, Wood & Minbashian, 2010; Huang & Ryan, 2011; Minbashian, Wood, & Beckmann, 2010). Hence, an HLM approach was used to calculate individual contingencies (Level 1) and to estimate the "typical individual's" contingencies and individual differences in the contingencies (Level 2). However, coefficients provided by HLM are unstandardized and

can, therefore, pose some challenges to their appropriate interpretation. As a result, correlation coefficients, which also represent estimations of effect sizes, were calculated to answer the same question through two complementary approaches of data analysis. However, it should be noted that correlation coefficients can only reflect relationships between variables. No causal inferences can be made.

To address research question 1, within-person variability in state WTC was quantified and then compared to between-person variability in state WTC, using (1) standard deviations for illustrative purposes (following Fleeson's, 2001, approach), and (2) an unconditional two-level hierarchical linear model (HLM, Raudenbush & Bryk, 2002). To investigate the systematicity of variability (research question 2), Pearson's correlation coefficients were used to estimate the extent to which state WTC correlated with selected situation perceptions. Correlation coefficients were calculated both between and within individuals (i.e. over time), aiming at explaining both between- and within-person variability in state WTC. In addition, a conditional two-level hierarchical linear model (HLM, Raudenbush & Bryk, 2002) was used to estimate situation-contingent WTC, with state WTC being the dependent variable and each situational antecedent being the independent variable. In addressing research question 3, correlation coefficients between situation-contingent WTC (i.e. the contingencies between state WTC and selected situation perceptions) and end-of-term English scores were tested, and then, in a second step, mean state WTC was controlled for to test whether within-person variability in state WTC predicts end-of-term English scores.

VII Results

1 Variability in state WTC

To investigate how state WTC fluctuated during the semester (research question 1), state WTC on each measurement occasion was averaged across all individuals. As depicted in Figure 1 (panel 1), the aggregated trajectory fluctuates little and shows a slight decrease. This seems to suggest that state WTC did not significantly vary across different measurement occasions during the semester. However, when looking at each participant individually (panel 2), not a single individual trajectory mirrored the aggregated trajectory (i.e. fluctuating around 5 on a 7-point scale throughout the semester). This indicates that individuals' state WTC varied from

measurement occasion to measurement occasion, and also differed from each other on each measurement occasion. If one was to only focus on the aggregate level, then both between- and within-person variability in state WTC would have been overlooked.

<INSERT FIGURE 1 ABOUT HERE>

To quantify variability in state WTC and to compare between different variability quantities (i.e. within- vs between-person variability), we first followed Fleeson's approach of using standard deviations to estimate the extent of between- and within-person variability (see Fleeson, 2001 for details).

Amount of within-person variability. The *total* variability (total variation in Figure 2) was determined by calculating the standard deviation of scores for state WTC across all responses collected over the semester ($N = 1118$), regardless of whether the responses were from the same individual. By doing this, it is assumed that individuals overlapped completely in their distributions of state WTC over time, and there were few between-person differences. Hence, the total amount indicates the maximal possible amount of within-person variability in state WTC in the current context.

<INSERT FIGURE 2 ABOUT HERE>

The *within-person* variability in state WTC was determined by calculating the standard deviation of scores for state WTC across all measurement occasions for each individual separately, i.e. each standard deviation represents an individual's amount of within-person variability across the semester (participants who had submitted only one report were excluded from this analysis). The average variability across all individuals' standard deviations represents an estimate of the "*typical individual's*" within-person variability in state WTC. As shown in the second bar of Figure 2, the average amount of within-person variability accounts for about two thirds of the total variability. This indicates that the distributions of state WTC were wide, and there might be a large degree of overlap between individuals.

Figure 3 depicts the distributions of state WTC reported by three exemplar individuals who responded to all of the 13 measurement occasions. The distribution represented by the solid line (participant X) is similar to the typical individual's distribution, indicating relatively high state WTC and moderate within-person variability over the semester (mean = 5.00; $SD = 0.82$). Compared to the typical individual, the individual represented by the dashed line (participant

Z) has a similar level of state WTC but a considerably higher level of within-person variability (mean = 5.23; $SD = 2.09$), whereas the individual represented by the dotted line (participant Y) has higher but less variable state WTC (mean = 6.00; $SD = 0.41$). According to Figure 3, these three individuals' distributions overlap considerably: (a) like the one whose state WTC is less variable (dotted line), the one who varies greatly (dashed line) also tends to be willing to communicate on most occasions; and (b) for the one whose state WTC is relatively stable (dotted line), state WTC also varies on some occasions. This suggests that a mere consideration of means (i.e. central tendencies) is likely to mask meaningful individual differences, and that appropriate analyses need to include standard deviations that are indicative of within-person variabilities.

<INSERT FIGURE 3 ABOUT HERE>

Within- vs between-person variability comparison. To enable their comparison, we derived a mean score of state WTC across all measurement occasions for each participant as an estimate of within-person variability and the standard deviation across all participants as an estimate of between-person variability (see Fleeson, 2001). The standard deviation now represents the amount of variability in state WTC across different individuals (the third bar in Figure 2). The results indicate that the amount of within-person variability in state WTC was nearly as much as that observed between individuals.

To further compare these amounts of variability, they were estimated by using an unconditional two-level hierarchical linear model (HLM, Raudenbush & Bryk, 2002), with state WTC being the dependent variable. Results show that nearly half (46%) of the total amount of variability in state WTC occurred within individuals ($e = 1.12$).³ This result corresponds with the outcome reported earlier using Fleeson's (2001) approach.

2 *Systematicity of variability in state WTC*

Between-person relationships between state WTC and situation perceptions. To address research question 2 (Systematicity), the relationships between state WTC and the selected situation characteristics (e.g. teacher and peer support, task-interest, task-importance, and task-difficulty) as well as their major underpinning dimensions (e.g. duty, positivity, and negativity) were calculated. All participants' scores for the above variables were averaged across all measurement occasions to calculate individual mean scores on each scale. The correlation

coefficients between mean state WTC and each situational variable were then calculated across individuals, to ascertain whether *between-person* variability in state WTC was systematically related to perceived changes in the respective situation characteristic.

As shown in Table 1, at the between-person level state WTC significantly and positively correlated with support ($r = .51$). For support subscales, teacher support, classmate support, and partner support were all significantly associated with state WTC, although the association with partner support ($r = .29$) was somewhat weaker compared to that of teacher support ($r = .53$) and classmate support ($r = .54$). For situation characteristics related to the features of tasks, task-importance ($r = .60$) and task-interest ($r = .65$) significantly and positively correlated with state WTC, whereas perceptions of task-difficulty did not. As for the major dimensions of situation characteristics, duty ($r = .24$) and positivity ($r = .64$) were positively related to state WTC, whilst perceptions of negativity were negatively related to state WTC ($r = -.23$).

<INSERT TABLE 1 ABOUT HERE>

Within-person relationships between state WTC and situation perceptions. The correlation coefficients presented above represent the *between-person relationships* between mean state WTC and selected situation perceptions, indicating the systematicity of between-person variability in state WTC. To investigate the systematicity of within-person variability in state WTC, the *within-person relationships* between state WTC and each situational variable were calculated individually for each of the participants. These within-person situation-state relationships are referred to as ‘situation contingencies’ in the literature (Fleeson, 2007). On average, at the within-person level, state WTC was moderately and positively related to all situational variables, except for difficulty and negativity. Each coefficient above the diagonal of Table 1 is the average of the within-person correlations (i.e. contingencies), representing the typical within-person situation-WTC relationship. The underpinning individual correlation coefficients vary considerably indicating interindividual differences in the within-person situation-WTC relationships. The standard deviations reported in Table 2 represent these differences. They should, however, not be confused with individual differences in mean state WTC. Whilst individual differences in mean state WTC (i.e. between-person variability) signify that individuals differed in state WTC during the semester; individual differences in within-person situation-WTC relationships indicate that individuals differed in how they responded to different situations, i.e. reflect individual differences in within-person variability (Fleeson, 2007).

<INSERT TABLE 2 ABOUT HERE>

To investigate individual differences in within-person variability, the ranges of the within-person correlation coefficients that describe 68% of the sample (i.e. $\pm 1 SD$) were estimated using SPSS. As shown in Table 2, the contingencies between state WTC and each situational antecedent (except for difficulty and negativity) varied from slightly negative to highly positive. This indicates that although a clear majority of individuals' state WTC was positively associated with the perceived situational antecedents under study, some had stronger links than others, i.e. some individuals were more likely than others to adjust their state WTC when perceiving changes in learning situations. Additionally, for a small number of students state WTC was negatively correlated with one or more of these situational antecedents.

Interestingly, state WTC was neither associated with difficulty ($r = .06$) nor negativity ($r = -.04$) at the within-person level. To note, at the between-person level state WTC was significantly and negatively associated with negativity ($r = -.23$). This suggests that between- and within-person relationships between state WTC and negativity differ. This confirms that insights regarding within-person relationships cannot be inferred from between-person data (see also e.g., Grice, 2015; Schmitz, 2006). At the between-person level, learners who perceived communication situations more negatively tended to be less willing to communicate (as compared to those with a more positive perception of such situations). At the within-person level, however, state WTC in different situations was not associated with negative perceptions of specific learning situations. This means that – from a within-person perspective – as learners perceived a communication situation as more negative, they did not necessarily become less willing to communicate.

As a caveat, as some participants missed one or more measurement occasions, the number of responses varied. Hence, one could argue, the estimates for individuals who responded to most or even all measurement occasions tend to be more trustworthy than those for individuals who provided data on only a few occasions. To test the sensitivity of the results on data completeness, we analysed within-person relationships between state WTC and different situational antecedents through *conditional hierarchical linear models using HLM*.⁴

The HLM results were similar to those of the correlational tests presented earlier (see Table 3), as state WTC was positively associated with situational antecedents such as support ($\beta_{10} = 0.41$, $t = 6.03$, $p < .001$), task-importance ($\beta_{10} = 0.35$, $t = 6.69$, $p < .001$), and task-interest ($\beta_{10} = 0.29$,

$t = 6.17, p < .001$). State WTC was also positively related to the major dimensions of situation characteristics, such as duty ($\beta_{10} = 0.19, t = 4.40, p < .001$) and positivity ($\beta_{10} = 0.38, t = 8.23, p < .001$), but was not significantly related to difficulty ($\beta_{10} = 0.06, t = 1.19, p = .24$) or negativity ($\beta_{10} = -0.06, t = -1.57, p = .12$).

<INSERT TABLE 3 ABOUT HERE>

The results of HLM analysis also showed significant individual differences in the contingencies, although on average most of the situational antecedents correlated positively with state WTC at the within-person level. To further investigate these individual differences, the ranges of situation-WTC contingencies (π_1) that represented 68% of the sample (i.e. $\pm 1 SD$) were estimated (see Table 3). A clear majority of participants positively adjusted their state WTC in response to positive changes in the perception of the respective situation (increases in e.g. task-support). Interestingly, however, a minority responded negatively to positive changes. For example, some individuals were slightly less willing to communicate when they felt they were obliged to engage in a task (i.e. duty).

Both correlation coefficients and HLM outputs showed that some individuals responded more sensitively than others when perceiving changes in the situation, and some individuals responded inversely compared to the clear majority of students. To better explain individual differences in within-person variability, the contingency between state WTC and task-interest will be further analysed as an example (see Figure 4). A typical individual's interest-WTC contingency (β_{10}), each individual's interest-WTC contingency (π_1), and three extreme cases of π_1 are depicted in the three panels of Figure 4, respectively. The typical individual's contingency (β_{10}) shows a clear positive relationship between state WTC and task-interest (panel 1); while individual contingencies (π_1) show individual differences (panel 2): although most participants show positive contingencies, some show steeper contingencies than others, and some show negative contingencies. These individual differences are more evident when comparing the three extreme cases shown in panel 3. Participant Z represented by the dashed line shows a positive contingency, indicating that this person's state WTC tended to increase when perceiving a task as more interesting; while participant X represented by the solid line shows a contingency that approaches 0, indicating this person's state WTC to be independent of the perception of task-interest. By contrast again, participant Y represented by the dotted line shows a slightly negative contingency, indicating the rare occurrence of a decrease in a person's state WTC when task-interest increased.

<INSERT FIGURE 4 ABOUT HERE>

3 *Predictability of systematic variability in state WTC*

In addressing research question 3 (Predictability), a significant correlation was found between mean state WTC and end-of-term English scores ($r = .31, p < .01$). To further investigate whether systematic within-person variability in state WTC predicts language learning performance, relationships between situation-contingent WTC (i.e. within-person relationships between state WTC and situation perceptions) and end-of-term English scores were assessed. As previously discussed, there are two ways of estimating contingencies between state WTC and situation perceptions: (a) calculating a correlation coefficient for each participant, and (b) using the contingencies provided in HLM outputs. Consequently, the relationships between situation-contingent WTC and end-of-term English scores were also analysed in two ways.

Firstly, correlations between within-person situation-WTC correlations and end-of-term English scores were calculated. As shown in Table 4, only the interest-WTC contingency stood out, significantly and positively predicting end-of-term English scores ($r = .30$). That is, students whose state WTC increased when perceiving a communication task as more interesting tended to perform better, and vice versa. Additionally, the support-WTC and positivity-WTC contingencies also seemed to slightly predict end-of-term English scores; however, the correlations were relatively small ($r = .24, r = .22$).

<INSERT TABLE 4 ABOUT HERE>

To clarify the relationship between the interest-WTC correlation and language learning performance, a regression analysis was conducted with end-of-term English scores being the dependent variable and controlling for mean state WTC. As shown in Table 5, the interest-WTC correlation still predicted end-of-term English scores when controlling for mean state WTC, although the effect was slightly smaller ($\beta = .25$). Altogether, 40% of the variability in end-of-term English scores was explained by the two predictors, interest-WTC correlation and mean state WTC.

<INSERT TABLE 5 ABOUT HERE>

Secondly, correlations between individual contingencies (π_1) estimated using HLM (Raudenbush & Bryk, 2002) and end-of-term English scores were calculated. The results were

similar (see Table 6). Only one out of the six situation-WTC contingencies (i.e. interest-WTC contingency) significantly and positively predicted end-of-term English scores ($r = .29$).

<INSERT TABLE 6 ABOUT HERE>

When controlling for mean state WTC, the interest-WTC contingency still significantly predicted end-of-term English scores ($\beta = .27$; see Table 7). Altogether, 41% of the variability in end-of-term English scores was explained by the two predictors, interest-WTC contingency and mean state WTC. The results obtained employing HLM were in accordance with the results based on correlation analysis presented earlier, indicating that regardless of individuals' mean levels of state WTC, those who had higher levels of interest-contingent WTC (i.e. an increase in state WTC in response to an increase in task-interest) seemed to have achieved higher grades at the end of the semester.

<INSERT TABLE 7 ABOUT HERE>

VIII Discussion

This study was undertaken to investigate (a) whether there is between- and within-person variability in state WTC, (b) whether this variability is systematic and meaningful, i.e. related to selected situational antecedents, and (c) whether systematic variability in state WTC predicts language learning performance. To achieve this, the study used a high-density repeated measurement design, using a questionnaire to repeatedly measure a group of Chinese university students' state WTC and other related variables in English lessons. The collected data were analysed both at between- and within-person levels of analysis.

The results indicate that there is not only between-person but also within-person variability in state WTC across different lessons during one semester. These results provide the basis for answering research question 1 (Variability). The amount of within-person variability in state WTC is comparable in size to the observed amount of between-person variability. This confirms previous results on moment-to-moment variability in state WTC (e.g. MacIntyre & Legatto, 2011; Mystkowska-Wiertelak & Pawlak, 2014; Pawlak & Mystkowska-Wiertelak, 2015); however, it is not in line with Mystkowska-Wiertelak (2016), who did not find much within-person variability in state WTC across different lessons over one semester. However,

Mystkowska-Wiertelak's (2016) finding does not contradict the current finding, as she only analysed the data at the aggregate level without looking at individual state WTC trajectories.

By way of answering research question 2 (Systematicity), results suggest that between- and within-person variability in state WTC is systematically associated with situation characteristics (e.g. support, task-interest, task-importance, etc.) and major underpinning situation dimensions (e.g. duty, positivity, negativity, etc.). At the *between-person* level, when comparing individuals, those who scored higher on these situational characteristics tended to be more willing to communicate during the semester than their counterparts. For example, students who reported to receive more support from the teacher and their peers compared to others, tended to also be more willing to communicate. These results are generally in line with previous research (e.g. Cao, 2011, 2013, 2014; Kang, 2005; Peng, 2012; Zhong, 2013). However, we did not find a correlation between state WTC and task-difficulty, unlike de Saint Léger and Storch (2009) and Kang (2005). One reason might be that the relationship between task-difficulty and state WTC is nonlinear, as also suggested by Eddy-U (2015), such that tasks should be neither too difficult nor too easy to promote state WTC.

At the *within-person* level, it was found that state WTC in different situations co-varied with changes in students' perceptions of communication situations. For example, students tended to be more willing to communicate when perceiving tasks as more interesting. Unlike previous studies (e.g. Cao, 2011, 2013, 2014; Kang, 2005; Peng, 2012; Zhong, 2013) using small samples together with qualitative data collected through interviews and learning journals to provide detailed descriptions of how state WTC may be facilitated in different situations, the study reported here was the first to statistically analyse the co-variance between state WTC and its situational antecedents within individuals using a relatively large sample and by employing a hierarchical linear modelling approach. In addition, individual differences were found in these within-person relationships: (a) some individuals were more likely than others to adjust their state WTC in response to perceived changes in the learning situation, and (b) some individuals modified their state WTC in the opposite direction to what was observed for the majority of the sample. Prior research has not directed much attention at individual differences in within-person variability in state WTC. To our knowledge, only Cao's (2013) and Pawlak et al.'s (2016) very small-scale studies have compared individual state WTC trajectories to identify individual differences in within-person fluctuations in state WTC over time.

As for research question 3 (Predictability), the current research represents the first effort to

investigate the relationships between situation-contingent WTC and language learning performance. It was found that the contingency of state WTC on task-interest significantly correlated with end-of-term English scores. That is, students whose state WTC tended to increase when perceiving communication tasks as more interesting also tended to perform better in class during the semester and/or in their final exam. Although no previous research has investigated the contingencies of state WTC on situation characteristics in the field of SLA, the contingencies of personality states on situations have been studied by researchers in the field of personality science (e.g. Wood et al., 2019). For instance, Fleeson (2007) used contingencies to explain within-person variability and found that Big-Five personality states were contingent on a set of different situation characteristics, such as friendliness of interlocutors and task orientation. The effects of these contingencies on performance have also been studied. For example, Minbashian et al. (2010) found that task-contingent conscientiousness predicted adaptive performance, i.e. individuals with higher levels of task-contingent conscientiousness were more likely to maintain their performance as task complexity increased. However, in the current study only interest-contingent WTC (out of five WTC contingencies under study) significantly predicted language learning performance. This highlights the importance of interest for language learners' active engagement in language lessons (Cao, 2013), which ultimately has positive effects on their language learning performance. As concluded by Fryer in his recent review, interest is a critical and sustainable source of motivation for learning in language classrooms (Fryer, 2019). Results also suggest that other WTC-related situation contingencies are less effective in terms of SLA outcomes. To deepen our understanding of the role of WTC in the context of SLA and to be better able to facilitate effective language learning future research is advised to further explore systematic within-person variability in state WTC across different learning situations.

IX Desiderata

In this study data on language learning performance were based on self-report. This could be perceived as a limiting factor in terms of validity and subsequently generalisability. Due to data-protection regulations it was not possible to verify whether the exam scores were reported accurately. We believe, however, that the anonymity in data collection mitigated the risk of potential attempts to intentionally report inaccurate scores. When possible, future research should seek access to official records or use teacher reports to ensure reliability of language

learning performance data.

The paper-based exam used as criterion in our study with its emphasis on grammar and vocabulary might be perceived as an imperfect measure of communicative competence. We cautiously argue, however, that (a) grammar and vocabulary are integral parts of effective communication, be it oral or otherwise, and (b) using an indirect measure of communicative competence has created a somewhat conservative approach to testing our hypotheses. Future research may, however, seek to include more behaviour-based performance measures of communication competence such as oral exams to extend current findings.

Teachers' evaluations of students' communication performance – as another performance measure in our study – might be perceived as being too subjective in order to provide valid information about students' communicative competence. On the other hand, however, one might argue that teachers are trained and experienced in passing professional judgments. At the same time and from a standpoint of ecological validity students' certified success in education very much depends on their teacher's evaluations of their behaviour and performance.

Due to the nature of our sample (science undergraduates) the majority of the participants were males. This might limit the generalisability of our findings across gender. The study of potential gender differences in WTC – as done, for instance, by Baker and MacIntyre (2000) or Li (2012) at the trait level – was not in the focus of the study presented here. Future research may include sampling strategies that allow to further clarify the role of gender as a potentially moderating factor in the context of WTC research.

X Conclusion

Focusing on the state characteristics of WTC, this study incorporates a dynamic perspective to shed light on systematic within- and between-person variability in state WTC and its contribution to the prediction of language learning performance. Our findings suggest that the perception of task-interest might be a facilitator of state WTC and language learning performance. Hence, language teachers who would like to encourage state WTC in language classrooms should not underestimate the impact of students' interest in the form and context in which language learning is embedded. This is the first study to statistically analyse the contingencies between state WTC and its situational antecedents within individuals, and to

provide evidence for the predictive power of interest-contingent WTC in relation to language learning performance. This suggests that variability in state WTC across different situations is meaningful and thus deserves further investigation. When studying variability in state WTC, future research should focus on the individual level: (a) identifying within-person variability in state WTC, and (b) comparing such variability across individuals.

The high-density repeated measurement approach introduced in the current study represents a promising and relatively new method to investigate within-person variability in state WTC over time. This approach allows to better describe and potentially understand the dynamics of intra-personal processes in relation to situational factors and is therefore highly relevant to the study of WTC. It brings into focus how perceptions of situations in terms of interest and demands can play a potentially facilitating role in the behavioural manifestation of state WTC. Such insights might be of interest to language teachers and language learners alike for creating and managing effective learning situations.

Footnotes

1. This study used the same group of participants as Zhang et al. (submitted).
2. This student responded 7 (i.e. not at all) to all odd items and 1 (i.e. extremely) to all even items across all 13 measurement occasions.
3. Level 1 model: State WTC = $\pi_0 + e$, where π_0 refers to an individual's mean level of state WTC, and e refers to within-person variability in state WTC. Level 2 model: $\pi_0 = \beta_{00} + r_0$, where β_{00} refers to the grand mean of state WTC, and r_0 refers to between-person variability in state WTC. The total amount of variability in state WTC is $e + r_0$.
4. Level 1 model (group-mean centred): State WTC = $\pi_0 + \pi_1$ (e.g. task-importance) + e , where π_0 refers to an individual's mean level of state WTC, π_1 refers to the individual's important-WTC contingency, and e refers to within-person variability in state WTC. Level 2 model (grand-mean centred): $\pi_0 = \beta_{00} + r_0$, $\pi_1 = \beta_{10} + r_1$, where β_{00} refers to the grand mean of state WTC, r_0 refers to an individual's deviation from the grand mean of state WTC, β_{10} refers to the mean of importance-WTC contingency, and r_1 refers to an individual's deviation from the mean importance-WTC contingency.

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Table 1

Between- and within-person correlations between state WTC and situation perceptions

	Mean	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Classmate support	4.96	.81											.22
2. Partner support	4.97	.75	.74**										.19
3. Teacher support	5.05	.94	.84**	.61**									.27
4. Overall support	4.99	.75	.95**	.85**	.92**								.25
5. Task-importance	4.84	1.01	.67**	.60**	.55**	.67**							.32
6. Task-difficulty	4.38	1.16	.26**	.37**	.08	.25*	.31**						.06
7. Task-interest	4.88	.97	.77**	.57**	.62**	.72**	.77**	.16					.30
8. Duty	4.56	1.14	.49**	.42**	.40**	.48**	.48**	.22*	.43**				.19
9. Positivity	5.07	.91	.72**	.54**	.62**	.69**	.73**	.12	.76**	.39**			.34
10. Negativity	3.15	1.07	-.13	-.15	-.14	-.15	-.18	.30**	-.13	.06	-.22*		-.04
11. State WTC	4.95	1.19	.54**	.29**	.53**	.51**	.60**	-.08	.65**	.24*	.64**	-.23*	

Note. Coefficients below the diagonal are between-person correlations ($N = 102$); coefficients above the diagonal are within-person correlations ($N = 1118$). * $p < .05$; ** $p < .01$.

Table 2

Descriptive statistics for within-person situation-WTC Pearson correlations

	Mean	<i>SD</i>	Significance rate	Range of <i>r</i>
Support-WTC correlation	.25	.40	22%	$-.15 \leq r \leq .65$
Importance-WTC correlation	.32	.37	24%	$-.06 \leq r \leq .68$
Difficulty-WTC correlation	.06	.44	12%	$-.38 \leq r \leq .50$
Interest-WTC correlation	.30	.37	21%	$-.07 \leq r \leq .67$
Duty-WTC correlation	.19	.37	16%	$-.18 \leq r \leq .56$
Positivity-WTC correlation	.34	.38	27%	$-.04 \leq r \leq .72$
Negativity-WTC correlation	-.04	.43	16%	$-.47 \leq r \leq .39$

Table 3

Descriptive statistics for situation-WTC contingencies estimated using HLM

	β_{10}	r_1	χ^2	df	Range of π_1
Support-contingent WTC	.41	.42	198.23	91	$-.01 \leq \pi_1 \leq .83$
Importance-contingent WTC	.35	.32	174.35	89	$.03 \leq \pi_1 \leq .67$
Difficulty-contingent WTC	.06	.32	200.20	90	$-.26 \leq \pi_1 \leq .38$
Interest-contingent WTC	.29	.30	174.61	88	$-.01 \leq \pi_1 \leq .59$
Duty-contingent WTC	.19	.24	137.23	86	$-.05 \leq \pi_1 \leq .43$
Positivity-contingent WTC	.38	.27	171.91	87	$.11 \leq \pi_1 \leq .65$
Negativity-contingent WTC	-.06	.25	191.96	90	$-.31 \leq \pi_1 \leq .19$

Note. Level 1 model (group-mean centred): State WTC = $\pi_0 + \pi_1$ (e.g. support) + e , where π_1 refers to each individual's contingency. Level 2 model (grand-mean centred): $\pi_0 = \beta_{00} + r_0$ and $\pi_1 = \beta_{10} + r_1$, where β_{10} refers to the mean of individuals' contingencies, and r_1 refers to the deviation of individuals' contingencies from the mean contingency.

Table 4Pearson correlations between situation-WTC correlations and performance ($N = 62 - 93$)

	1.	2.	3.	4.	5.
1. Support-WTC correlation					
2. Importance-WTC correlation	.44**				
3. Interest-WTC correlation	.62**	.48**			
4. Duty-WTC correlation	.32**	.24**	.29**		
5. Positivity-WTC correlation	.50**	.32**	.62**	.31**	
6. End-of-term English score	.24	-.01	.30*	-.10	.22

* $p < .05$; ** $p < .01$.

Table 5

Regression of performance on interest-WTC correlation and state WTC

	Adjusted R^2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
(Constant)	.07	69.52	1.59		43.79	.00		
Interest-WTC correlation		8.26	3.39	.30	2.44	.02	1.00	1.00
(Constant)	.13	58.65	5.12		11.45	.00		
Interest-WTC correlation		7.05	3.33	.25	2.12	.04	.97	1.03
State WTC		2.27	1.02	.27	2.23	.03	.97	1.03

Dependent Variable: End-of-term English score

Table 6

Correlations between situation-contingent WTC and performance estimated using HLM ($N = 63 - 69$)

	1.	2.	3.	4.	5.
1. Support-contingent WTC					
2. Importance-contingent WTC	.39**				
3. Interest-contingent WTC	.58**	.46**			
4. Duty-contingent WTC	.52**	.27*	.42**		
5. Positivity-contingent WTC	.32**	.35**	.49**	.34**	
6. End-of-term English score	.11	-.01	.29*	.01	.15

* $p < .05$; ** $p < .01$.

Table 7

Regression of performance on interest-contingent WTC and state WTC

	Adjusted R^2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
(Constant)	.07	70.57	1.41		50.16	.00		
Interest-contingent WTC		5.30	2.34	.29	2.27	.03	1.00	1.00
(Constant)	.14	58.43	5.23		11.16	.00		
Interest-contingent WTC		4.94	2.25	.27	2.19	.03	1.00	1.01
State WTC		2.47	1.03	.29	2.40	.02	1.00	1.01

Dependent Variable: End-of-term English score

Figure 1

Aggregated and individual trajectories of state WTC over one semester

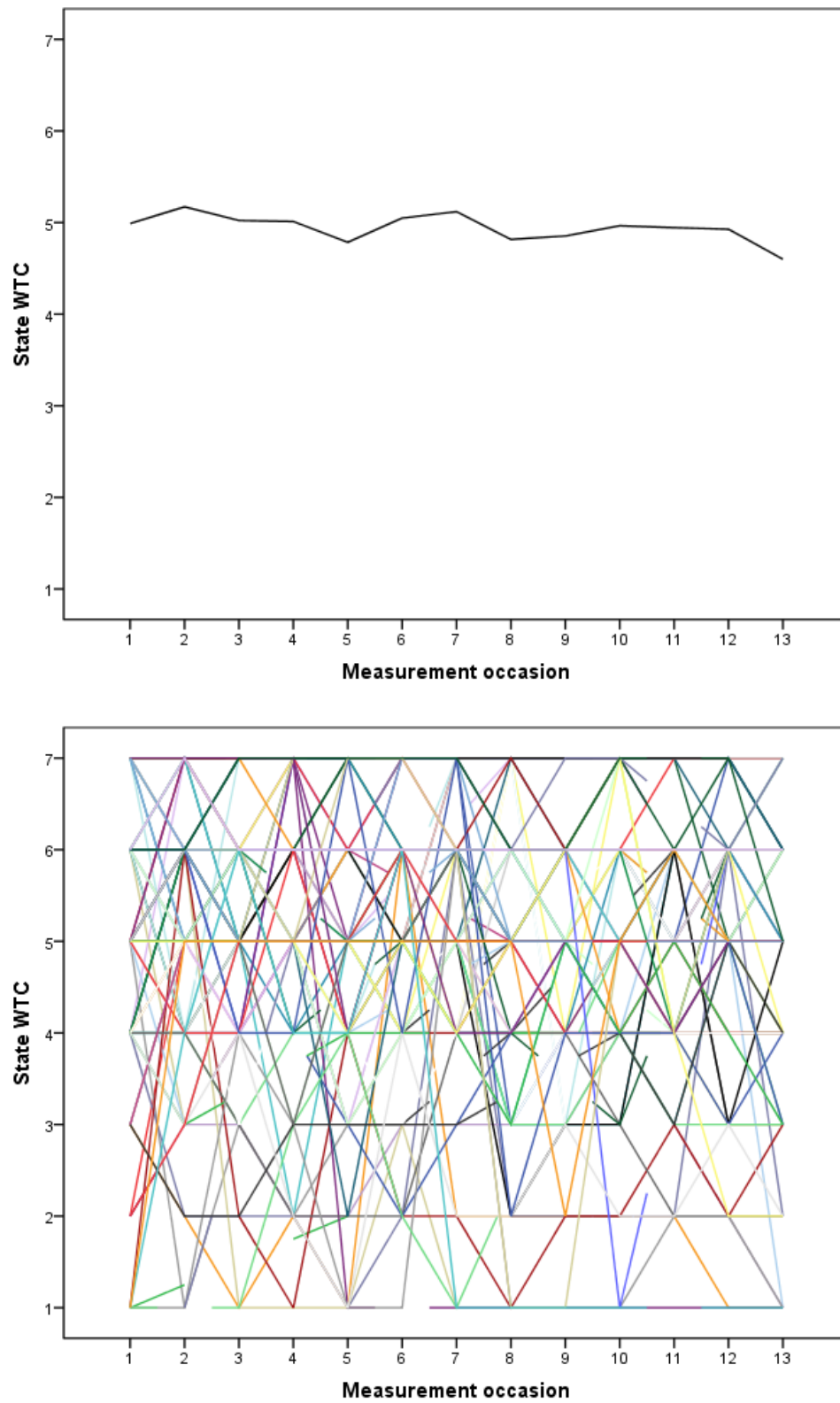


Figure 2

Variabilities in state WTC

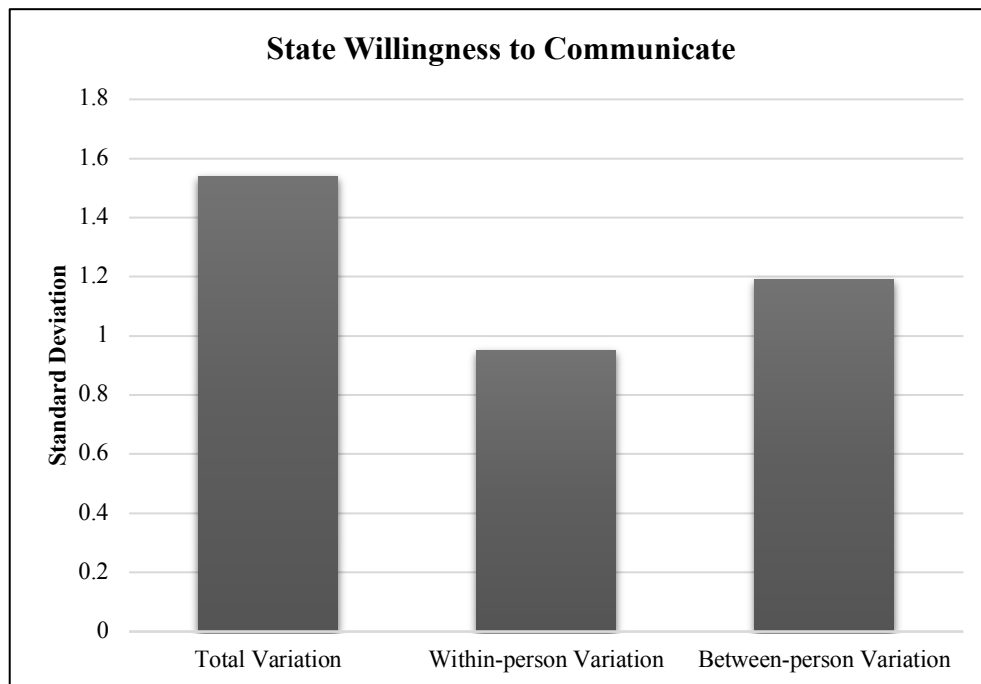


Figure 3

Three individual distributions of state WTC

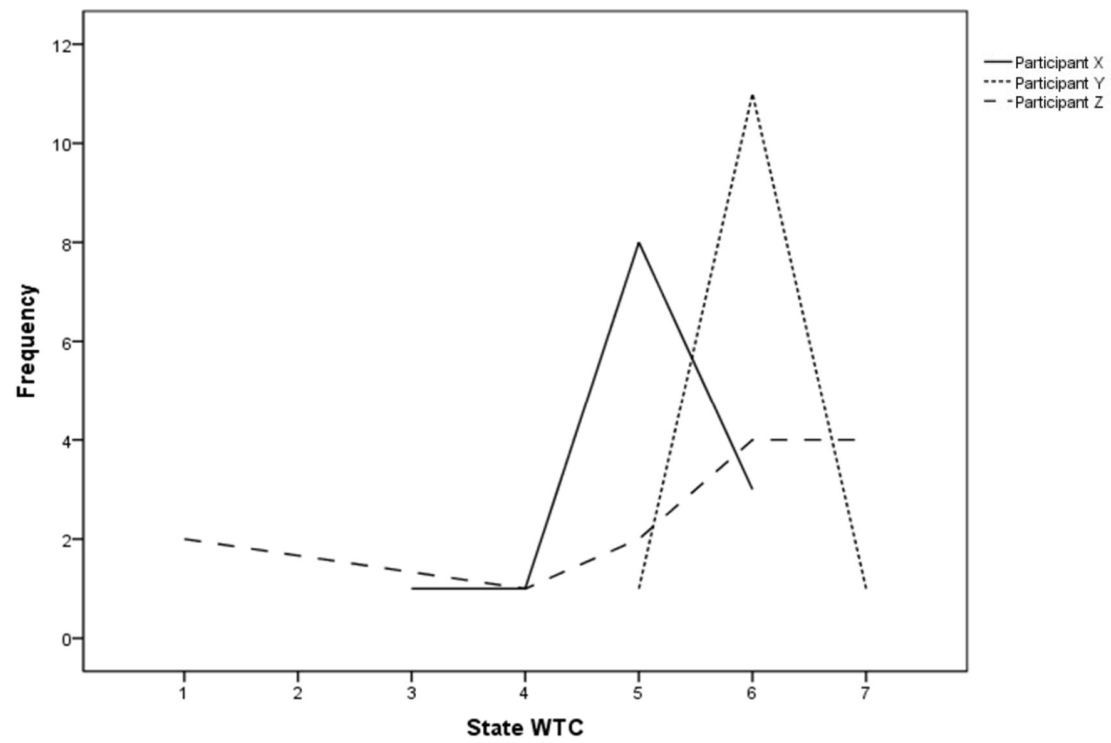
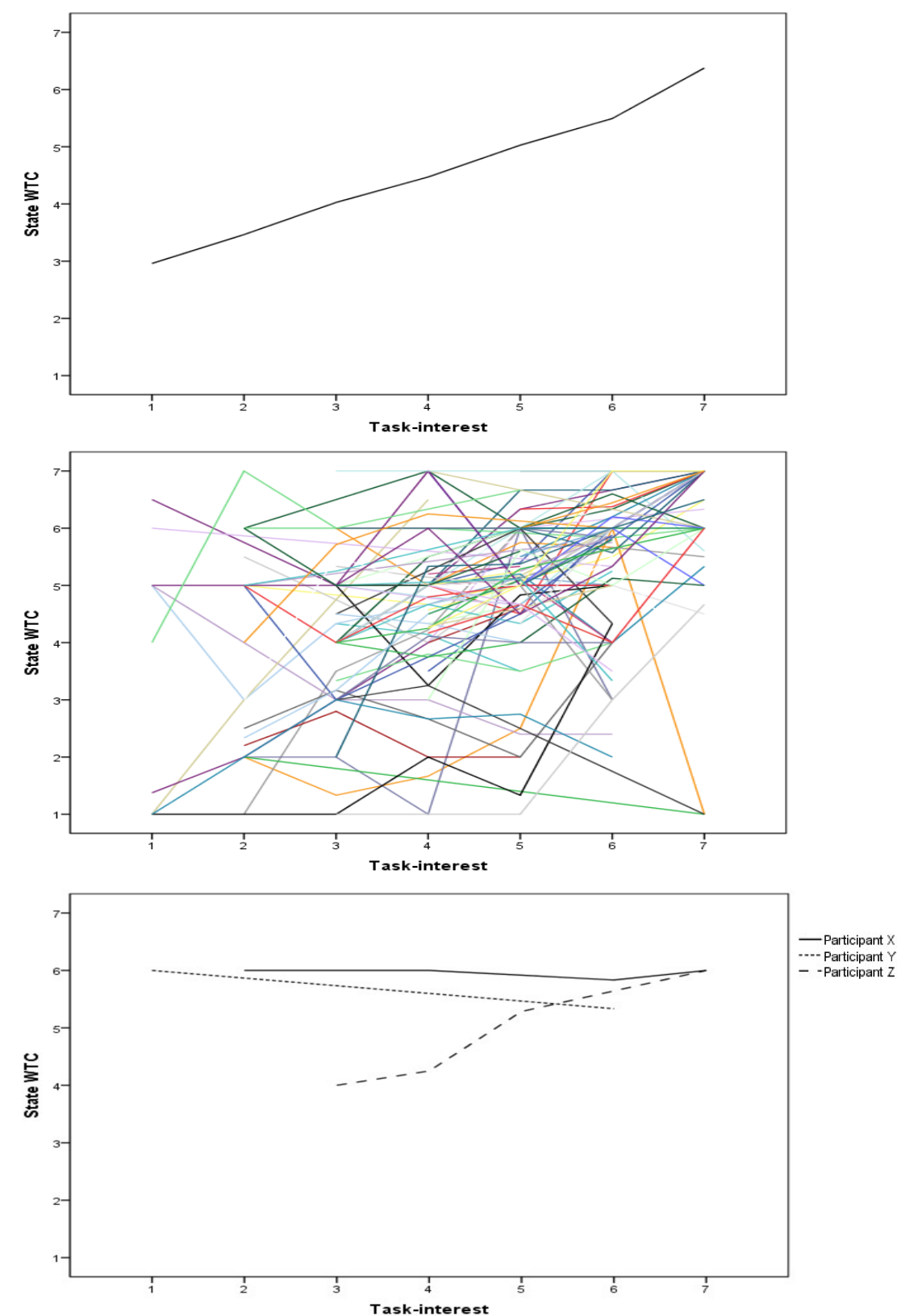


Figure 4

Aggregated and individual interest-WTC contingencies



Appendix A

Self-report questionnaire

Instructions: In this questionnaire, we would like to know how you think and feel about yourself and your experience IN THIS CLASS AT THIS POINT IN TIME. When answering the questions, please think about an activity when you were given the chance to communicate IN ENGLISH with your teacher or peers, either orally or in writing. Please mark the box that best describes your response in relation to THAT SPECIFIC ACTIVITY.

Situation cues and characteristics

The activity was important.

The activity was difficult.

The activity was interesting.

The class was active.

My teacher was supportive.

My classmates were supportive.

I was familiar with the people I interacted with.

The English proficiency of the people I interacted with was higher than mine.

The people I interacted with were cooperative.

There were sufficient opportunities to communicate.

Situation dimensions

Work had to be done.

Deep thinking was required.

Somebody was being threatened, accused, or criticised.

Potential romantic partners were present.

The situation was pleasant.

The situation contained negative feelings (e.g. stress, anxiety, shame).

Social interactions were expected.

State WTC

I was willing to communicate in English during the activity.